

CLAIMS

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1. A powder coating composition in which powder particles are an agglomerate of individual particulate components fused or bonded together into composite particles, wherein the individual particulate components comprise
- (1) one or more coloured film-forming base components having a Dv.99 of no more than $30\mu\text{m}$, and
- (2) one or more uncoloured film-forming components, wherein at least one component (2a) (i) has a Dv.99 that is more than $20\mu\text{m}$ and (ii) has a higher Dv.99 or higher Dv.50 than component (1) or, when there is more than one coloured component, than those components taken together, the ratio of coloured film-forming base component(s) to uncoloured film-forming component(s) in the composition being in the range of from 1:99 to 60:40 by weight.
2. A powder coating composition as claimed in claim 1, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 10% by weight of the total film-forming components.
3. A powder coating composition as claimed in claim 1 or claim 2, wherein there is no more than 30% by weight, calculated on the weight of the total film-forming components, of uncoloured film-forming component(s) having a Dv.99 (i) that is no higher than the Dv.99 of the coloured film-forming component or components taken together, and (ii) that is less than $20\mu\text{m}$.

4. A powder coating composition in which powder particles are an agglomerate of individual particulate components fused or bonded together into composite particles, wherein the individual particulate components comprise

(1) one or more coloured film-forming base components each having a Dv.99 of no more than 30µm, in an amount of from 1 to 60% by weight of the total film-forming components, and

(2)(a) one or more uncoloured film-forming components each having a Dv.99 of more than 20µm and each having a higher Dv.99 and/or a higher Dv.50 than the coloured film-forming base component (1) or, when there is more than one such component, than those components taken together, in an amount of from 10 to 99% by weight of the total film-forming components, and, if desired,

(b) one or more other uncoloured film-forming components, in an amount of up to 30% by weight of the total film-forming components.

5. A powder coating composition as claimed in any one of claims 1 to 4, wherein there are two or more coloured film-forming base components (1).

6. A powder coating composition in which powder particles are an agglomerate of individual particulate components fused or bonded together into composite particles, wherein the individual particulate components comprise

(1) two or more coloured film-forming base components having a Dv.99 of no more than 30µm, and

(2) one or more uncoloured film-forming components, at least one component (2a) having a Dv.99 of more than 20µm and that is higher than the Dv.99 of

component (1) or, when there is more than one such component, of those components taken together,

the ratio of coloured film-forming base components (1) to uncoloured film-forming component(s) (2) in the composition being in the range of from 1:99 to 30:70 by weight.

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7. A powder coating composition as claimed in claim 6, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 10% by weight of the total film-forming components.

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8. A powder coating composition as claimed in claim 6 or claim 7, wherein there is no more than 30% by weight, calculated on the weight of the total film-forming components, of uncoloured film-forming component(s) having a Dv.99 (i) that is no higher than the Dv.99 of the coloured film-forming component or components taken together, and (ii) that is less than 20 μ m.

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9. A powder coating composition as claimed in any one of claims 1 to 8, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components has a Dv.99 of at least 30 μ m.

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10. A powder coating composition as claimed in claim 9, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components has a Dv.99 of at least 35 μ m.

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11. A powder coating composition as claimed in claim 10, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components has a Dv.99 of at least 40 μ m.

12. A powder coating composition in which powder particles are an agglomerate of individual particulate components fused or bonded together into composite particles, wherein the individual particulate components comprise

- 5 (1) two or more coloured film-forming base components having a Dv.99 of no more than 30 μ m, and
- (2) one or more uncoloured film-forming components, at least one component (2a) having a Dv.99 of more than 40 μ m,

the ratio of coloured film-forming base components to uncoloured film-forming
10 component(s) in the composition being in the range of from 1:99 to 60:40 by weight.

13. A powder coating composition as claimed in claim 12, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 10% by weight of the total film-forming components.

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14. A powder coating composition as claimed in claim 12 or claim 13, wherein there is no more than 30% by weight, calculated on the weight of the total film-forming components, of uncoloured film-forming component(s) having a Dv.99 (i) that is no higher than the Dv.99 of the coloured film-forming component or components
20 taken together, and (ii) that is less than 20 μ m.

15. A powder coating composition as claimed in any one of claims 1 to 14, wherein the ratio of coloured film-forming base components (1) to uncoloured film-forming component(s) (2a) is in the range of from 1:99 to 50:50 by weight.

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16. A powder coating composition as claimed in claim 15, wherein the ratio of coloured film-forming base components (1) to uncoloured film-forming component(s) (2a) is in the range of from 1:99 to 40:60 by weight.

5 17. A powder coating composition as claimed in claim 16, wherein the ratio of coloured film-forming base components (1) to uncoloured film-forming component(s) (2a) is in the range of from 1:99 to 30:70 by weight.

10 18. A powder coating composition as claimed in claim 17, wherein the ratio of coloured film-forming base components (1) to uncoloured film-forming component(s) (2a) is in the range of from 5:95 to 30:70.

15 19. A powder coating composition as claimed in any one of claims 1 to 18, wherein the uncoloured film-forming component or components (2) are present in an amount of at least 50% by weight of the total film-forming components.

20 20. A powder coating composition as claimed in claim 19, wherein the uncoloured film-forming component or components (2) are present in an amount of at least 60% by weight of the total film-forming components.

21. A powder coating composition as claimed in claim 20, wherein the uncoloured film-forming component or components (2) are present in an amount of at least 70% by weight of the total film-forming components.

25 22. A powder coating composition as claimed in any one of claims 2 to 21, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 20% by weight of the total film-forming components.

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23. A powder coating composition as claimed in claim 22, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 30% by weight of the total film-forming components.

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24. A powder coating composition as claimed in claim 23, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 40% by weight of the total film-forming components.

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25. A powder coating composition as claimed in claim 24, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 50% by weight of the total film-forming components.

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26. A powder coating composition as claimed in claim 25, wherein the uncoloured film-forming component or components (2a) are present in an amount of at least 60% by weight of the total film-forming components.

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27. A powder coating composition as claimed in any one of claims 1 to 26, wherein there is no more than 15% by weight, calculated on the weight of total film-forming components, of uncoloured film-forming component(s) (2b).

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28. A powder coating composition as claimed in any one of claims 1 to 27, wherein there are two or more compatible coloured film-forming base components (1).

29. A powder coating composition as claimed in any one of claims 1 to 28, wherein the uncoloured film-forming component (2a) or at least one of the uncoloured

film-forming components listed under (2a) and (2b) is compatible with the coloured film-forming base components (1) during film-formation.

30. A powder coating composition as claimed in any one of claims 1 to 29,
5 wherein the uncoloured film-forming component (2a) or at least one of the uncoloured film-forming components listed under (2a) and (2b) is incompatible with the coloured film-forming base component(s) (1) or becomes incompatible therewith during film-formation.

10 31. A powder coating composition as claimed in any one of claims 1 to 30, wherein the coloured film-forming base component(s) (1) contain a polyester.

32. A powder coating composition as claimed in claim 30 and claim 31,
15 wherein the uncoloured film-forming component (2a) or at least one of the uncoloured film-forming components listed under (2a) and (2b) contains a polyester having a different functionality from the polyester of the coloured film-forming base component(s) (1).

20 33. A powder coating composition as claimed in claim 31 or claim 32, which includes an uncoloured film-forming component (2a) or (2b) containing a polyester, that component and the coloured film-forming base component(s) (1) containing different curing agents, one of those being an epoxy curing agent or a co-reactable epoxy resin.

25 34. A powder coating composition as claimed in any one of claims 1 to 33, which includes an uncoloured film-forming component (2a) or (2b) which is itself an agglomerate of an uncoloured film-forming component fused or bonded to form composite particles with a non-film-forming component.

35. A powder coating composition as claimed in any one of claims 1 to 34, wherein component (2a) or (2b) includes a texturing additive.

5 36. A powder coating composition as claimed in claim 34, wherein the agglomerated component (2a) or (2b) includes mica.

37. A powder coating composition as claimed in any one of claims 1 to 36, wherein the uncoloured film-forming component (2a) or at least one of the uncoloured
10 film-forming components (2a) has a Dv.99 of no more than 90 μ m.

38. A powder coating composition as claimed in any one of claims 1 to 37, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.90 of at least 14 μ m.
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39. A powder coating composition as claimed in claim 38, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.90 of at least 18 μ m.

20 40. A powder coating composition as claimed in any one of claims 1 to 39, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.90 of no more than 75 μ m.

41. A powder coating composition as claimed in any one of claims 1 to 40, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.99 in the range of from 50 to 65 μ m.
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42. A powder coating composition as claimed in any one of claims 1 to 41, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.50 in the range of from 5 to 45 μ m.

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43. A powder coating composition as claimed in claim 42, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.50 of at least 8 μ m.

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44. A powder coating composition as claimed in claim 43, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.99 of at least 40 μ m and a Dv.50 of at least 10 μ m

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45. A powder coating composition as claimed in claim 43 or claim 44, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components (2a) has a Dv.50 in the range of from 12 to 30 μ m.

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46. A powder coating composition as claimed in any one of claims 1 to 45, wherein the coloured film-forming base components or at least one of the coloured film-forming base components (1) have a Dv.99 in the range of from 6 to 25 μ m.

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47. A powder coating composition as claimed in any one of claims 1 to 46, wherein the coloured film-forming base components or at least one of the coloured film-forming base components (1) have a Dv.50 of no more than 18 μ m.

48. A powder coating composition as claimed in claim 47, wherein the coloured film-forming base components or at least one of the coloured film-forming base components (1) have a Dv.50 of no more than 15 μ m.

5 49. A powder coating composition as claimed in claim 48, wherein the coloured film-forming base components or at least one of the coloured film-forming base components (1) have a Dv.50 in the range of from 2 to 12 μ m.

10 50. A powder coating composition as claimed in any one of claims 1 to 49, wherein the coloured film-forming base components contain in total from 5 to 70 weight % of pigment, calculated on the total weight of those components.

15 51. A powder coating composition as claimed in any one of claims 1 to 50, wherein the coloured film-forming base components contain in total from 0.5 to 50 weight % of pigment, calculated on the total weight of the composition.

20 52. A powder coating composition as claimed in any one of claims 1 to 51, wherein the individual particulate components of the agglomerate include one or more non-film-forming component (3).

53. A powder coating composition as claimed in claim 52, wherein the individual particulate components of the agglomerate include a texturing agent (3).

25 54. A powder coating composition as claimed in claim 52 or claim 53, wherein the non-film-forming component or components constitute up to 50% by weight of the total particulate components of the composition.

55. A kit comprising the following separate particulate components for agglomerating into powder coating compositions for the preparation of powder coatings in a number of different colours:

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- a plurality of differently coloured film-forming base components, each with a Dv.99 of no more than 30 μ m, and
 - one or more uncoloured film-forming components, each having a higher Dv.99, and/or a higher Dv.50, each Dv.99 being more than 40 μ m.

10 56. A kit as claimed in claim 55, wherein the uncoloured film-forming component or at least one of the uncoloured film-forming components has a Dv.99 of no more than 90 μ m.

15 57. A kit as claimed in claim 55 or claim 56, which includes at least 7 differently coloured film-forming base components.

20 58. A kit as claimed in any one of claims 55 to 57, which includes an uncoloured film-forming component that is compatible during film-formation with the coloured film-forming base components, and an uncoloured film-forming component that is incompatible with the coloured film-forming base components or that becomes incompatible therewith during film-formation.

25 59. A kit comprising the following separate particulate components for the manufacture of agglomerated powder coating compositions for the preparation of powder coatings in a number of different colours:

- at least 7 differently coloured film-forming base components,

- an uncoloured film-forming component that is compatible with the coloured film-forming base components and remains compatible during film-formation and that has a Dv.99 of more than 40 μ m and no more than 90 μ m, and
- an uncoloured film-forming component that is incompatible with the coloured film-forming base components or that becomes incompatible therewith during film-formation, and that has a Dv.99 of more than 40 μ m and no more than 90 μ m.

60. A kit as claimed in claim 59, which includes means for comminution of the coloured film-forming base components to a powder having Dv.99 of no more than 30 μ m.

61. A kit as claimed in any one of claims 55 to 60, wherein the different components are as specified in any one of claims 31 to 53.

62. A kit as claimed in any one of claims 55 to 61, which includes at least 3 uncoloured film-forming components.

63. A kit as claimed in any one of claims 55 to 62, which includes means for agglomerating the components to produce a fluidisable powder.

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64. A process for the preparation of a powder coating composition as claimed in any one of claims 1 to 54, which comprises providing the specified one or more coloured film-forming base components (1) and the one or more specified uncoloured film-forming components (2a) and if desired one or more other components selected from other uncoloured film-forming components (2b) and non-film-forming components (3), in the specified proportions, and mixing and agglomerating the

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components into composite particles such that the composition is air-fluidisable and can be applied to a substrate by electrostatic spray.

5 65. A process for the preparation of a powder coating composition as
claimed in claim 1 from a kit comprising a plurality of differently coloured film-forming
base components and one or more uncoloured film-forming components having a
Dv.99 of more than $40\mu\text{m}$, which comprises comminuting at least one of the coloured
film-forming base components to provide a powder having a Dv.99 of no more than
30 μm , and mixing and agglomerating the comminuted coloured film-forming base
10 component(s) and at least one of the specified uncoloured film-forming components
having a Dv.99 or a Dv.50 higher than the Dv.99 or Dv.50 respectively of the
comminuted coloured film-forming base component or components taken together, in
the proportions specified in claim 1, to form composite particles, such that the
composition is air-fluidisable and can be applied to a substrate by electrostatic spray.

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66. A powder coating composition when prepared by a process as claimed
in claim 64 or claim 65.

20 67. A process for forming a coating on a substrate, which comprises
applying an agglomerated composition as claimed in any one of claims 1 to 54 or claim
66 to a substrate, and heating the applied composition to form a continuous coating.

68. A substrate coated by a process as claimed in claim 67.